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SPECIFICATION FOR DIURON, TECHNICAL

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Indian Standard
SPECIFICATION FOR DIURON, TECHNICAL

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Indian Standard

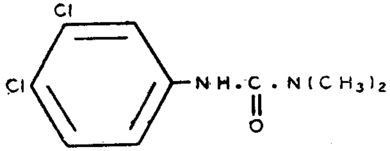
SPECIFICATION FOR DIURON, TECHNICAL

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 January 1978, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Diuron, technical is used for general weed control. It has been also used selectively in certain crops.

0.3 Diuron is the accepted common name by the International Organization for Standardization (ISO) for 3-(3, 4-dichlorophenyl)-1, 1-dimethylurea. The empirical and structural formulae and the molecular mass of diuron are indicated below:

Empirical Formula	*Structural Formula*	*Molecular Mass*
$C_9H_{10}Cl_2N_2O$		233

0.4 In the preparation of this standard due consideration has been given to the provisions of the Insecticides Act, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for diuron, technical.

---

*Rules for rounding off numerical values (*revised*).

2. REQUIREMENTS

2.1 Description — The material shall essentially comprise 3-(3, 4-dichlorophenyl)-1, 1-dimethylurea, and shall be in the form of white to cream powder, free from extraneous materials or added modifying agents.

2.2 The material shall also comply with the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR DIURON, TECHNICAL

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix	Cl No. of IS : 6940-1973*
(1)	(2)	(3)	(4)	(5)
i)	Diuron content, percent by mass, *Min*	98	A	—
ii)	Melting point	158-159°C	—	6
iii)	Water content, percent by mass, *Max*	1·0	—	4
iv)	Acidity (as H_2SO_4), percent by mass, *Max*	0·2	—	11.3.2
	OR			
	Alkalinity (as NaOH), percent by mass, *Max*	0·2	—	11.3.3

*Methods of tests for pesticides and their formulations.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in clean and dry, mild steel drums, with a polyethylene liner of thickness not less than 0·062 mm. The containers shall also comply with the general requirements as stipulated in **2** of IS : 8190 (Part I)-1976*.

3.2 Marking — The containers shall bear legibly and indelibly the following information, and additional information as is necessary under the Insecticides Act and Rules:

a) Name of the material;
b) Name of the manufacturer;
c) Date of manufacture;
d) Batch number;
e) Net mass of contents;

---

*Requirements for packing of pesticides: Part I Solid pesticides.

f) Diuron content, percent (*m/m*); and

g) The minimum cautionary notice as worded in Insecticides Act and Rules.

3.2.1 The container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in ' Indian Standard method for sampling of pesticides and their formulations ' (*under preparation*).

NOTE — Till such time the standard under preparation is published, the sampling plan shall be as agreed to between the parties concerned.

5. TESTS

5.1 Tests shall be carried out by the methods as referred to in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

APPENDIX A

[*Table* 1, *Sl No.* (i)]

DETERMINATION OF DIURON CONTENT

A-0. GENERAL

A-0.1 For the determination of diuron content, two methods, namely, aliphatic amine method (*see* **A-1**) and aromatic amine method (*see* **A-2**), have been prescribed. Either of these methods may be used.

---

*Specification for water for general laboratory use (*second revision*).

A-1. ALIPHATIC AMINE METHOD

A-1.1 Apparatus

A-1.1.1 *Hydrolysis Apparatus* — *See* Fig. 1.

A-1.2 Reagents

A-1.2.1 *Standard Sulphuric Acid* — 0·1 N.

A-1.2.2 *Standard Sodium Hydroxide Solution* — 0·1 N.

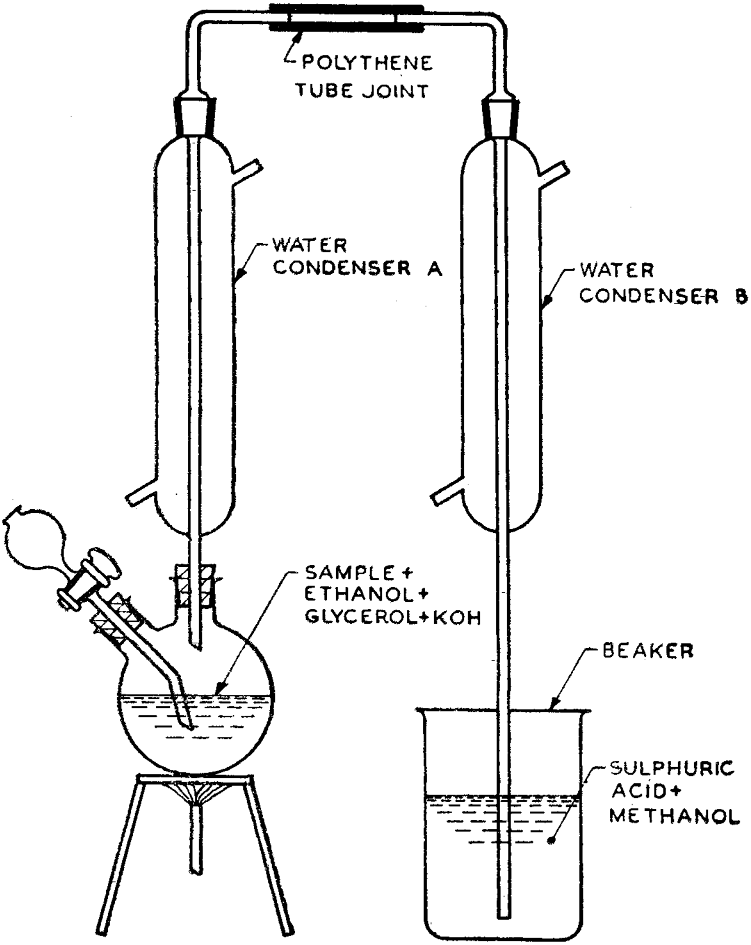


Fig. 1 Hydrolysis Apparatus for Diuron Content

A-1.2.3 *Glycerol*

A-1.2.4 *Potassium Hydroxide Solution* — 20 percent, aqueous solution.

A-1.2.5 *Silicone Defoamer*

A-1.3 Procedure

A-1.3.1 Assemble the hydrolysis apparatus. Add 50 ml of standard sulphuric acid, accurately measured from a burette, and 50 ml of methanol to the condensate beaker. Transfer an accurately weighed portion of the sample, containing 0·5 to 0·6 g of active ingredient, into the round bottom flask. Add 15 ml of ethanol and swirl to disperse the sample. Add 100 ml of glycerol, several drops (6-8) of silicone defoamer, one or two boiling chips and 100 ml of potassium hydroxide solution and immediately attach the reaction flask to the condenser *A*. With cooling water flowing through each condenser independently, reflux the mixture for 3½ hours. Remove the cooling water from condenser *A* and distill the vapours into the standard acid trap until the pot temperature reaches 175°C. Adjust the heating rate so that this temperature is attained in 1½ to 2½ hours. Rinse condenser *B* and the connecting tube with methanol followed by distilled water, adding the rinsings to the beaker trap. Titrate the contents of the beaker with standard sodium hydroxide solution using a *p*H meter with glass-calomel electrodes and determine the end point by a difference method rather than graphically.

A-1.4 Calculations

$$\text{Diuron content, percent by mass} = \frac{23{\cdot}31 \times (V_1N_1 - V_2N_2)}{M}$$

where

V_1 = volume, in ml, of standard sulphuric acid;
N_1 = normality of standard sulphuric acid;
V_2 = volume, in ml, of standard sodium hydroxide solution;
N_2 = normality of standard sodium hydroxide solution; and
M = mass, in g, of sample taken for test.

A-2. AROMATIC AMINE METHOD

A-2.1 Apparatus

A-2.1.1 p*H Millivolt Meter*

A-2.1.2 *Electrodes*

A-2.1.3 *Magnetic Stirrer and Stirring Bar*

A-2.2 Reagents

A-2.2.1 *Phosphoric Acid* — 85 percent.

A-2.2.2 *Chloroform*

A-2.2.3 *Sodium Hydroxide Solution* — 20 percent.

A-2.2.4 *Standard Hydrochloric Acid* — 3 N.

A-2.2.5 *Phenolphthalein Indicator Solution*

A-2.2.6 *Glacial Acetic Acid*

A-2.2.7 *Standard Perchloric Acid in Acetic Acid* — 0·1 N, standardized. Mix 8·5 ml of 72 percent perchloric acid with 300 ml of glacial acetic acid and 20 ml of acetic anhydride. Dilute to 1 litre with glacial acetic acid and allow to stand overnight to permit complete reaction of the acetic anhydride with the water present. Standardize by titrating against primary standard potassium acid phthalate, dissolved in 50 ml of glacial acetic acid and 25 ml of chloroform.

A-2.3 Procedure

A-2.3.1 Weigh sufficient sample to contain 1·0-1·5 g of active ingredient into a 100-ml flask, add 10 ml of phosphoric acid, connect a condenser to the flask and bring to a gentle boil. Continue to reflux for 3 hours. Cool and dilute to about 25 ml with distilled water.

A-2.3.2 Transfer the diluted hydrolysate to a 500-ml separating funnel containing 200 ml of shaved ice. Add about 25 ml of ice water, a drop of phenolphthalein indicator, and neutralize by adding cold sodium hydroxide solution in small increments. Add an additional 10 ml of sodium hydroxide solution, and extract this cold alkaline solution with one 25-ml portion of chloroform, followed by four 15-ml portions. Collect the chloroform phases in a 100-ml volumetric flask and dilute to volume. Pipette 25 ml of this solution into 50 ml glacial acetic acid contained in a 125-ml beaker. Add a magnetic stirring bar and place the beaker on stirrer platform. Immerse the electrodes, titrate with standard perchloric acid. Determine the end point graphically or by calculation.

A-2.4 Calculations

$$\text{Diuron content, percent by mass} = \frac{23{\cdot}31\,(V \times N) \times 4}{M}$$

where

V = volume, in ml, of standard perchloric acid;

N = normality of standard perchloric acid; and

M = mass, in g, of sample taken for the test.

(*Continued from page* 2)

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AMENDMENT NO. 1 OCTOBER 1979

TO

IS:8702-1978 SPECIFICATION FOR DIURON, TECHNICAL

Alteration

[*Page 4, Table 1, col 3, against Sl No.* (ii)] - Substitute '153° to 159°C' *for* '158-159°C'.

(AFCDC 6)

Reprography Unit, ISI, New Delhi

AMENDMENT NO. 2 FEBRUARY 1989
TO
IS : 8702 - 1978 SPECIFICATION FOR DIURON, TECHNICAL

[*Page* 4, *Table* 1, *Sl No*. (i), *col* 3] — Substitute '95·0' *for* '98'.

(AFCDC 6)

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AMENDMENT NO. 3 NOVEMBER 1997
TO
IS 8702 : 1978 SPECIFICATION FOR DIURON, TECHNICAL

(*Page* 4, *Table* 1, *col* 5) — Substitute 'IS 6940 : 1982*' *for* 'IS : 6940 - 1973*'.

(*Page* 4, *Table* 1, *footnote marked* '*') — Insert '(*first revision*)' at the end of text.

(*Page* 4, *clause* **3.1**) — Substitute 'IS 8190 (Part 1) : 1988*' *for* 'IS : 8190 (Part 1) - 1976*'.

(*Page* 4, *footnote marked* '*') — Insert '(*second revision*)' at the end of text.

(*Page* 5, *clause* **4.1**) — Substitute the following for the existing matter and delete the note:

"**4.1** Representative samples of the material shall be drawn as prescribed in IS 10946 : 1996 'Methods of sampling for technical grade pesticides (*first revision*)'."

(*Page* 5, *clause* **5.2**) — Substitute '(*see* IS 1070 : 1992*)' *for* '(*see* IS : 1070 - 1977*)'.

(*Page* 5, *footnote marked* '*') — Substitute 'Reagent grade water (*third revision*)' for the existing title.

(*Page* 8, *clause* **A-2.2.4**) — Delete and renumber the subsequent clauses.

(FAD 1)

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